COMPLETE SPECIFICATION.

Improvements relating to the Attachment of Components to Shafts.

We, STONE MANGANESE MARINE LIMITED, of Anchor and Hope Lane, London, S.E.7, a Company incorporated under the laws of Great Britain, do hereby declare the in-
5 vention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
10   This invention concerns improvements relating to the attachment of components to shafts, especially but not exclusively marine propellers to propeller shafts. Another especially useful application is the attach-
15 ment of drive pulleys to shafts. A particular object of the invention is to achieve an effective and reliable interference fit for the purpose of attaining a high torque-carrying capacity without the use of mechanical
20 attachment or locking means.
     According to the invention, interference between a component with a tapered or parallel hole and a shaft of complementary shape is produced by swelling the shaft
25 within the said hole with the assistance of means comprising a pin which has a slight taper, suitably between 1 in 30 and 1 in 70, and is fitted into an axial bore having a like taper and extending in the shaft for sub-
30 stantially the length of fit between the said hole and shaft, the pin being provided at its outer end with a fine thread, which is engaged in a complementary thread in the bore, and being also provided with passages
35 which communicate with grooves at the circumferential surface of the pin and through which hydraulic medium at high pressure is admitted at the same time as the pin is screwed into the bore. As the pin is
40 screwed in simultaneously with the supply of the said medium, the latter is sealed within the bore to swell the shaft within the

hole in the component and give the required intereference. When this interfer-
ence, which can readily be determined by 45 measurement in known manner, has been achieved, the hydraulic pressure is relieved, leaving the component attached to the shaft with a predetermined interference fit. To remove the component from the shaft, hy- 50 draulic pressure is applied through the pin and the pin is screwed out. The component can then be withdrawn from the shaft. Both for attachment and removal, the use of the hydraulic pressure ensures that only 55 a relatively small moment is required for turning the pin and a conventional fine thread can be employed.
     One manner of carrying the invention into effect will now be more fully described by 60 way of example and with reference to the accompanying drawing, which is a longitudinal section through part of a shaft 1 and a component 2 attached thereto. The component 2 might be the hub or boss of 65 a marine propeller, in which case the shaft 1 would be the propeller shaft. The component 2 might alternatively be the hub of a belt or chain pulley and the shaft 1 a driving or driven transmission shaft. The 70 hub 2 is mounted with a tapered hole 3 on a tapered end portion 4 of the shaft 1.
     Inside the tapered portion 4, the shaft 1 has a tapered axial bore 5 which accommodates a pin 6 having the same taper. A 75 good machine finish should be provided on the bore 5 and pin 6. As illustrated, the tapered bore 5 runs into a cylindrical bore 7 extending through the shaft 1, but it may have a closed, radiused, inner end. At its 80 outer end, the pin 6 is provided with a fine thread 8 which is screwed into a complementary thread in a recess 9 at the out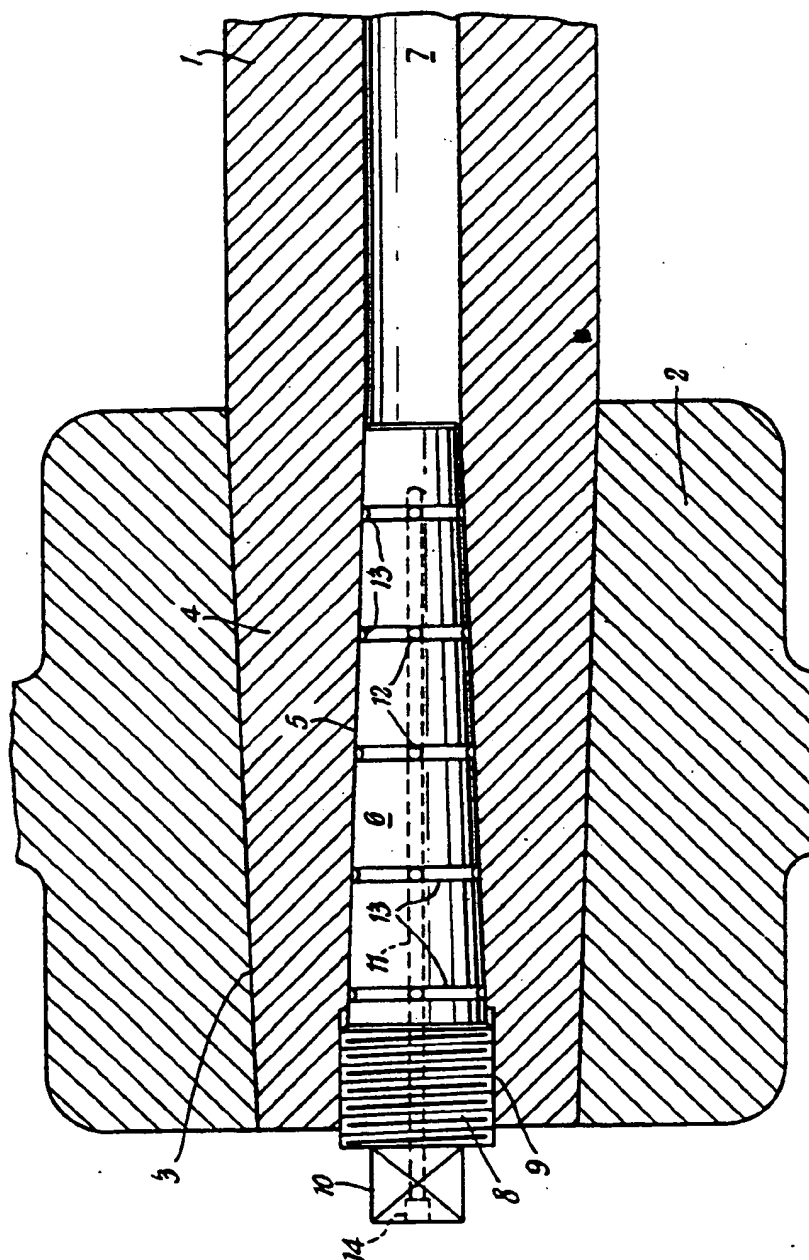er end of the bore 5. For turning the pin 6,